**Claims**

1. Method for the production of structural components out of long-fibre thermoplastic (LFT) with integrated continuous fibre (EF) reinforcements in a single stage LFT - pressing manufacturing process,
characterised in that

- impregnated EF - tapes (5) are melted open in a heating station (15) and subsequently are transferred into a two-part profile tool (21) of an EF - profile forming station (20),
- there are pressed for a short time period and in doing so are shaped into the required EF - profile (10) and that while this is done on the profile surface (11) through contact with the
- thermally conditioned profile tool (21) by means of a high heat transfer (Q1) a shock-cooled, dimensionally stable thin casing layer (12) is formed,
- the EF - profile following a defined short shock-cooling period (ts) is immediately completely separated from the profile tool and transferred into an LFT - tool (31) and there positioned in a defined manner,
- thereupon a molten LFT - mass (6) is introduced and together with the EF - profile (10) is put under pressure, resp., is pressed,
- so that the casing layer (12) is melted open again at the surface (11)
- and is thermoplastically melted together with the surrounding LFT - mass (6).

2. Method according to claim 1, characterised in that as the LFT - pressing manufacturing process an LFT - extrusion process with a vertical LFT - press (30) and a horizontal pressing tool (31) is utilised.

3. Method according to claim 1, characterised in that as the LFT - pressing manufacturing process an LFT - injection moulding process is utilised.

4. Method according to claim 3, characterised in that an LFT - injection moulding process with back pressing in the source flow is utilised.

5. Method according to claim 1, characterised in that several EF - profiles (10.1, 10.2, 10.3) are positioned in the LFT - tool (31) and subsequently pressed together with the LFT - mass (6).

6. Method according to claim 1, characterised in that EF - profiles are simultaneously produced in more than one EF - profile production line (20.1, 20.2).

7. Method according to claim 1, characterised in that in a profile tool (21) more than one EF - profile (10.1, 10.2) is produced.

8. Method according to claim 1, characterised in that in an EF - profile forming station (20) with more than one profile tool (21.1, 21.2) EF - profiles are pressed simultaneously.

9. Method according to claim 1, characterised in that in the EF - profile forming station a multi-stage profile forming process is carried out by means of a multi-part profile tool (21u, 21o, 21.3).

10. Method according to claim 1, characterised in that the EF - tapes (5) are pre-formed in plastic condition by pre-forming elements (19) during the transfer into the profile tool (21).

11. Method according to claim 1, characterised in that the EF - profiles (10) comprise a three-dimensional profile shaping.

12. Method according to claim 1, characterised in that the EF - profiles (10) in longitudinal direction comprise a bend, a twist, a fold and/or a surface structuring and differing cross-sectional shapes.

13. Method according to claim 1, characterised in that with the shaping of the tools (21, 31) shapings on the EF - profiles (22) and shapings of the LFT - mass (32) for force introductions and for force transmissions between the EF - profiles (10) and the LFT - mass (6) as well as to inserts (4) are produced.

14. Method according to claim 1, characterised in that an EF - profile with a positioning shoulder (55), a thick tensile - and compressive force zone (56) on top and underneath as well as a thinner thrust zone (57) in between is formed, which is positioned in a rib (8) or in a crimp (7) of the structural component.

15. Method according to claim 1, characterised in that the shock-cooling period (ts) is situated in the range of from 1 to 5 sec.

16. Method according to claim 1, characterised in that the LFT - mass (6) comprises an average fibre length of at least 3 mm.

17. Method according to claim 1, characterised in that the thermoplastic material consists of partially crystalline polymers.

18. Method according to claim 1, characterised in that the thermoplastic material consists of partially crystalline polymers such as polypropylene (PP), polyethylene-therephtalate (PET), polybutylene-therephtalate (PBT) or polyamide (PA) and the continuous fibre reinforcement (EF) consists of glass -, carbon - or aramide fibres.

19. Method according to claim 1, characterised in that the EF - profiles (10) comprise a thin surface layer (e.g., 0.1 – 0.2 mm) out of pure thermoplastic

material without EF - fibre reinforcement and/or are built-up out of layers with differing fibre orientations.

20. Method according to claim 1, characterised in that additional, shaped, EF - profiles (10*), which have been thermally inversely treated, with a non-deformable internal zone (88) and a molten external zone (89) are produced for the dimensionally stable transfer into the LFT - tool (31).

21. Method according to claim 1, characterised in that the EF - profiles comprise locally differingly strong shock-cooling zones with correspondingly differingly strong thermoplastic bonding between EF - profile (10) and LFT - mass (6) and (defined) differing profile shape preservation during the LFT - pressing.

22. Method according to claim 20, characterised in that the EF - profiles (10) comprise locally differing shock-cooling zones, e.g., with
minimum shock-cooling (T3, Q1.3),
medium shock-cooling (T2, Q1.2) and
strong shock-cooling (T1, Q1.1).

23. Method according to claim 1, characterised in that that a surface (11) of the EF - profiles adjacent to the LFT - tool (31) is beforehand strongly shock-cooled on one side and the opposite side is more weakly shock-cooled for the optimum bonding with the LFT - mass (6).

24. Method according to claim 17, characterised in that phase transformation heat of the crystalline material (crystallisation heat, latent heat) is exploited during the shock-cooling in a hysteresis range DEn.

25. Method according to claim 17, characterised in that surface (11) of the EF - profiles following the shock-cooling are very rapidly brought back again to a

temperature above DTkr from a temperature below the crystallisation temperature range DTkr.

26. Method according to claim 17, characterised in that during the shock-cooling with a slower passage through a crystallisation temperature range DTkr a corresponding crystalline proportion is generated in a lower layer (13).

27. Method according to claim 1, characterised in that the EF - profiles (10) are positioned in shapings (7, 8) of the LFT - tool (31) in differing fitting positions.

28. Method according to claim 1, characterised in that the EF - profiles (10) in the LFT - tool are positioned, resp., fixed on the lower (31u) and/or on the upper tool (31o).

29. Installation (40) for the production of structural components out of long-fibre thermoplastic (LFT) with integrated continuous fibre (EF) - reinforcements in a single stage LFT - pressing manufacturing process,
characterised by

- a heating station (15) for the heating-up of impregnated EF - tapes (5)
- an EF - profile forming station (20) for the shaping and shock-cooling with a profile press (23) and a two-part profile tool (21), into which the EF - tapes are transferred,
- there are pressed for a short time period and in doing so are shaped into the required EF - profile (10), so that by contact with the thermally conditioned profile tool (21) at the profile surface (11) with a high heat transfer (Q1) a shock-cooled, dimensionally stable thin casing layer (12) is formed and
- the EF - profile following a defined shock-cooling period (ts) is immediately completely separated from the profile tool and by means of a robot (42) is transferred into an LFT - tool (31) of an LFT - press (30) and there is positioned in a defined manner,

- thereupon a molten LFT - mass (6) is introduced and together with the EF - profile (10) is put under pressure, resp., is pressed,
- wherein the casing layer (12) is melted open again on the surface (11)
- and is thermoplastically melted together with the surrounding LFT - mass (6).

30. Installation according to claim 29, characterised by an EF - profile forming station (20) with profile tools (21), which in zones comprise locally differing thermal conditionings, resp., heat transfers (Q1), specific heats and heat penetration coefficients (ae) or tool temperatures (Twp).

31. Installation according to claim 29, characterised by an EF - profile forming station (20) with a transfer portal (17) and handling elements (19) for the pre-forming and transferring of the EF - tapes (5).

32. Installation according to claim 29, characterised by an IR - heating station (15) with a protection gas atmosphere (27), a chain conveyor (16), a transfer robot (42) with grippers (26, 37) for the transferring of the EF - profiles and molten LFT - mass, an LFT - extruder (34), an LFT - press (30) and an installation control system (45) with partial controls (25, 35, 36) for the different stations.

33. Structural component (1) with at least one EF - profile (10) in an LFT - mass (6), produced according to the method of claim 1 with shock-cooled EF - profiles.

34. Structural component according to claim 33, characterised in that the EF - profiles (10) comprise a precisely defined shaping and a precisely defined position within the structural component (1).

35. Structural component according to claim 33 with partially crystalline thermoplastic material, characterised in that the EF - profiles (10) in the zone of

a lower layer (13) below the profile surface (11) comprise an enhanced crystallisation (101).

36. Structural component according to claim 33 with partially crystalline thermoplastic material, characterised in that on contact surfaces (9) between EF - profiles (10) and LFT - mass (6) it comprises a directed crystallisation (102) over the contact surface.